

**Report 11137**  
**4 May 1998**

**Integrated**  
**Advanced Microwave Sounding Unit-A (AMSU-A)**  
**METSAT A1 Signal Processor Engineering Test Report**  
**(P/N: 1331670-2, S/N: F01)**

**Contract No. NAS 5-32314**  
**CDRL 207**

**Submitted to:**

**National Aeronautics and Space Administration**  
**Goddard Space Flight Center**  
**Greenbelt, Maryland 20771**

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## **1.0 Introduction**

This report presents a description of the tests performed, and the test data, for the A1 METSAT Signal Processor Assembly PN: 1331670-2, S/N F01. The assembly was tested in accordance with AE-26754, "METSAT Signal Processor Scan Drive Test and Integration Procedure".

The tests were conducted at room temperature in the AMSU-A test area of building 57. The tests fall into six categories: 1) Continuity, 2) Power Distribution, 3) Digital Processor, 4) Analog Processor, 5) Scan Drive, and 6) Supply Current.

## **2.0 Objective**

The objective is to demonstrate functionality of the signal processor prior to instrument integration.

## **3.0 Test Data**

All test data is presented on the enclosed copies of the test data sheets (TDSs) numbered A-2 through A-14. Redlines to the data sheets were necessary and were accomplished in accordance with program directive No. 91. Each change was approved by Quality and the test engineer. Changes were made for the following reasons: 1) Notes were added to verify the test equipment and/or test setup was correct, 2) Command instructions were clarified to remove any ambiguity in the instructions, and 3) Added and/or removed steps to improve the test flow.

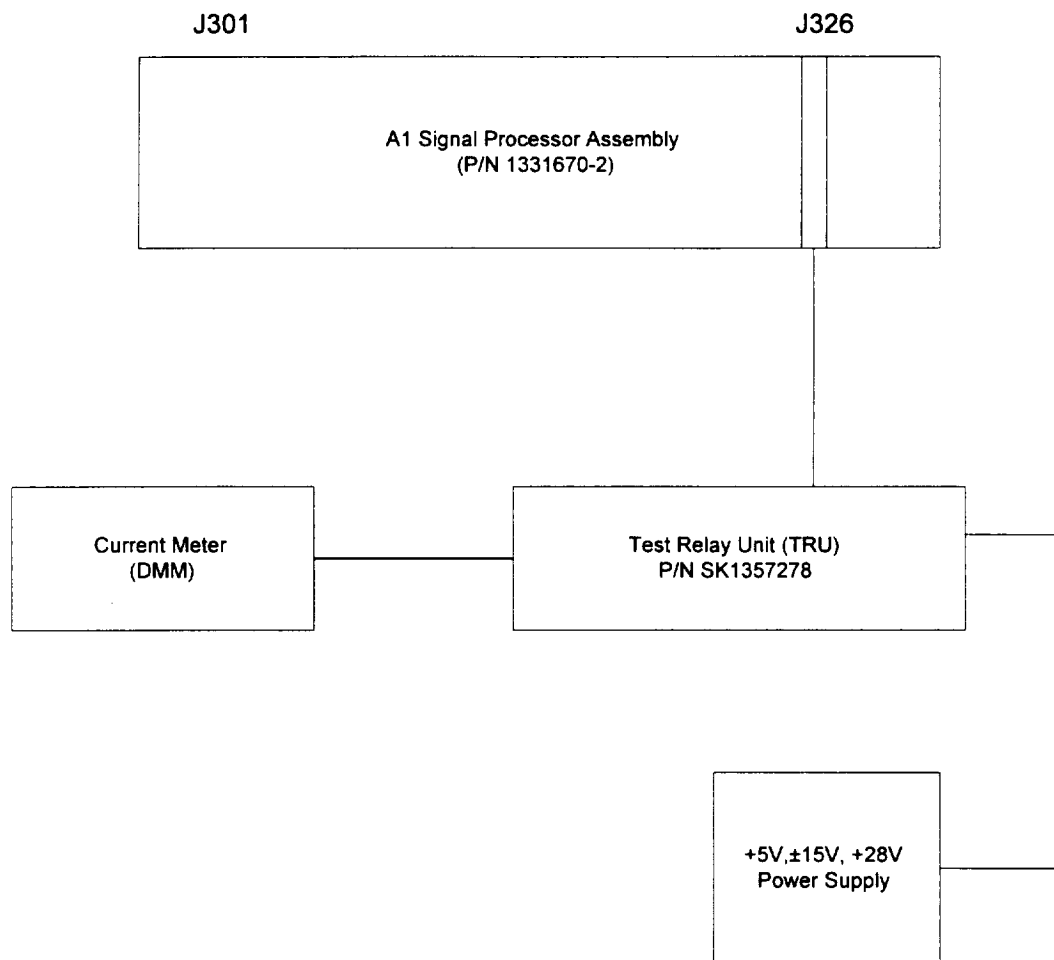
## **4.0 TESTS**

### **4.1 Continuity**

A complete continuity test of the backplane wiring is performed at the facility where the wirewrapping of the backplane is done. The continuity tests performed here involve 1) the I/O interface card slots, J301 and J326, 2) the Aerojet added Pre-amp/detector signal cable and connector, 3) the Aerojet added Pre-amp/detector power cable and connector, and 4) chassis return connections. The tests are manual resistance measurements tests. Test data is presented on TDS 1.

### **4.2 Power Distribution**

In these tests supply voltages are input to the signal processor from the Test Relay Unit (TRU) as in normal testing. No CCAs are installed in the signal processor for the tests. The test verifies that the four supply voltages are present on the proper pins of all backplane connectors. The test setup block diagram is shown in Figure 1, and test data is presented on TDS 2.



**Figure 1. A1 Signal Processor Test Setup**

#### **4.3 Digital Processor**

Beginning with this test, CCAs are installed into the card cage as required to perform the test, and then remain installed. At the conclusion of all tests, a complete set of CCAs has been installed. The complete test setup block diagram which is required for performing any of the tests is shown in Figure 2.

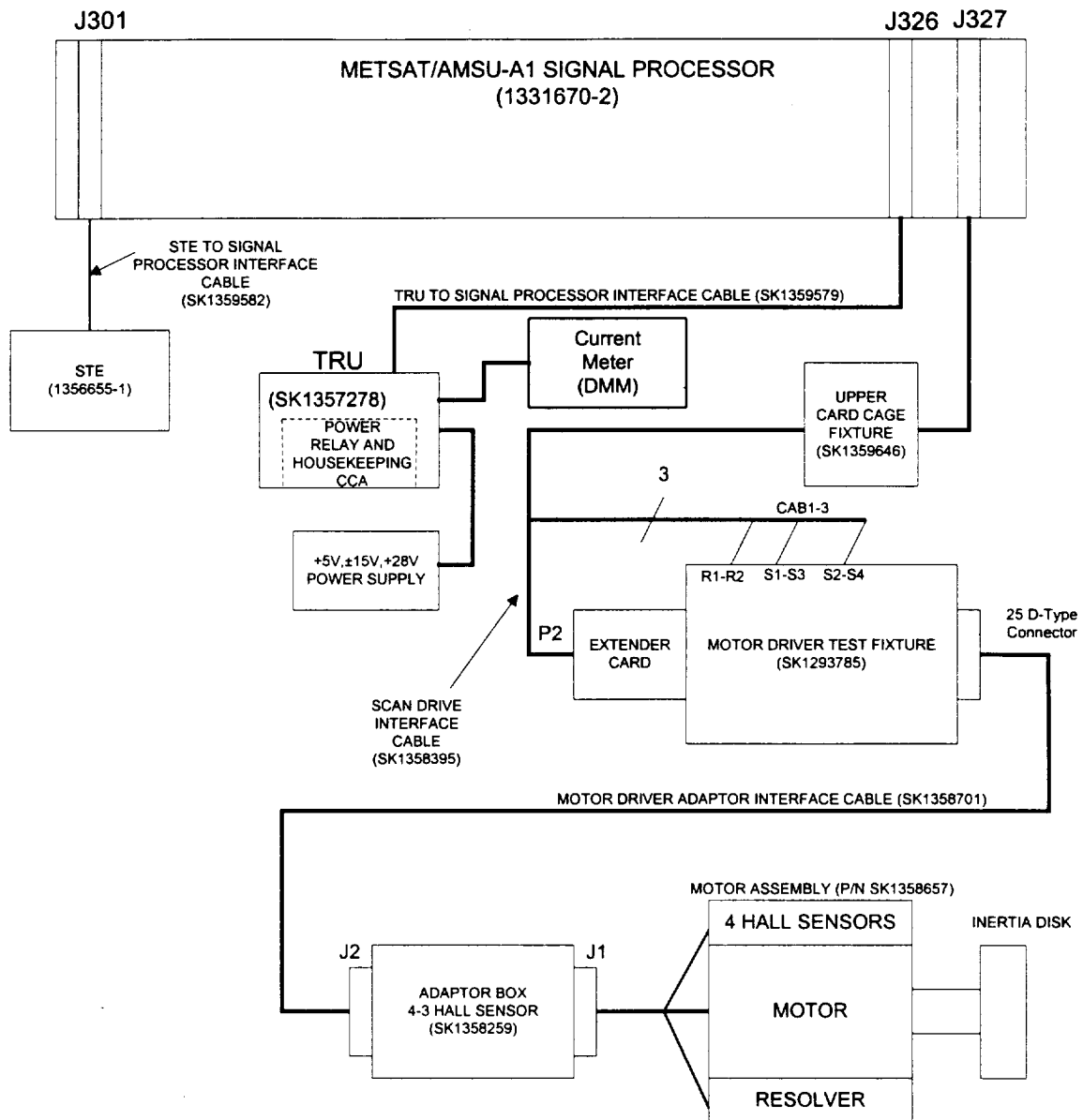


Figure 2 Scan Drive Test Set-Up

#### **4.3.1 Memory**

In this test, the digital test set is used in place of the CPU CCA to read and verify data of the test PROMs on the "GOLD" Memory CCA. Test data is presented on TDS 3.

#### **4.3.2 CPU**

The CPU test requires that the CPU Auxiliary test CCA be installed in place of the Memory CCA. In this test, the RAM and various instructions performed by the CPU are tested. In addition, the waveform of the clock signal to the DC-DC converter is measured at the CLOCK jack on the TRU. Test data is presented on TDS 3.

#### **4.3.3 Scan Control Interface**

In this test, input and output ports 0 through 3 are tested. In addition, the disable feature of the input ports is checked out. Test data is presented on TDS 3.

#### **4.3.4 Timing and Control**

In this test, the proper time intervals of I/H, DUMP, INTCMPL, TSCMPL, STOP, and ANTENNA STROBE are verified. In addition to the above tests, the test set also checks the input ports 16 and 17, output port #13 (4 MSBs), output port 14, input port #15 (DAC BSY signal), and output port #13 (4 LSBs). Test data is presented on TDS 3.

#### **4.3.5 Spacecraft Interface**

In this test, the STE is turned on and initialized. The STE is tested with a series of self-tests to verify the readiness of the STE to test flight hardware. After successfully passing the self-tests, the STE is used to simulate the spacecraft command signals and retrieve limited test data for the remaining signal processor tests. STE test data is presented on TDS 4.

#### **4.3.6 Relay Control**

This test verifies the operation of the module power command and the survival heater command. The presence of the +10 volt Interface power is verified. The PLO lock alarm signals, Scan 1 and 2 relay drive and position indicators, and PLO relay drive and relay position indicators are also verified. Test data is presented on TDS 4.

### **4.4 Analog Processor**

#### **4.4.1 Independence of Measurements**

This test is performed using the Analog CCA Test Fixture, the Integrate and Dump Filter and the Analog Mux and A/D Converter CCAs. The test gives a measurement of the sample-to-sample crosstalk within a channel, which is dependent on the completeness of the dump of the integration capacitor. Test data is presented on TDS 5.

#### **4.4.2 Integrate/dump filter, radiometric data multiplexing, and digitization tests**

In this test, a 2 volt dc signal is input to each integrate and dump filter, and the channel output code from the A/D converter is measured. The integrator output waveform is also displayed on an oscilloscope for verification of timing. Test data is presented on TDS 6.

#### **4.4.3 Temperature monitoring circuits**

In this test a resistor of value approximating the room temperature resistance of the PRTs is connected at the input of each PRT readout circuit, and the output code from the A/D converter is measured. The reference voltage used in the PRT readout circuits is also measured. Test data is presented on TDS 7.

#### **4.4.4 Analog telemetry**

In this test each of the analog telemetry signals is measured at the ANALOG HSKP jack on the TRU. Test data is presented on TDS 8.

#### **4.5 Scan Drive**

This test includes all CCAs involved in the scan drive function. The circuitry is programmed to provide one complete revolution of the drive motor as it steps through each of the thirty scene positions and the two calibration positions. The circuitry is programmed to park at the Warm Cal, Cold Cal, and the Nadir positions during the test sequence. The GSE test modes are also verified. To verify proper performance, the inertia disk on the motor shaft is visually observed through the one revolution and the various calibration positions. Test data is presented on TDS 9.

#### **4.6 Supply Current**

In this test, the total current drawn by the signal processor from each of the four supply voltages is measured with the signal processor fully populated with CCA's. Test data is presented on TDS 10.

### **5.0 TEST ANOMALIES**

Two test anomalies occurred. The first anomaly occurred when the clock signal was to be measured at the clock jacks on the TRU. No clock signal was present. The test was stopped and a Test Anomaly Report (attached) was opened (TAR 003142). Troubleshooting and visual inspection revealed that a twisted pair clock line was missing from the backplane. The test was continued and the twisted pair clock line was added by the wirewrap supplier after test completion.

The second anomaly occurred during the signal processor power distribution test. Minus 15 volts was measured on the +10 volt output. The test was stopped and a Test Anomaly Report (attached) was opened (TAR 002330). Troubleshooting and visual inspection revealed a piece of bare wire wedged between two sockets on connector J326. This wire shorted the -15V output to the +10V output (not powered at the time). The wire short was removed and the test was continued and successfully passed.

### **6.0 TEST RESULTS**

The METSAT/AMSU A1 SIGNAL PROCESSOR TEST was successfully completed and all test data is within specified limits.

TEST DATA SHEET 1  
A1 Continuity Tests (4.2.1)

From	To	Signal Name	Pass/Fail
J301-1	P511-3	CH 3 - IN	Pass
J301-10	P511-13	CH 8 - IN	Pass
J301-13	P511-15	CH 9 - IN	Pass
J301-15	P511-17	CH 10 - IN	Pass
J301-16	P511-19	CH 11 - IN	Pass
J301-19	P511-21	CH 12 - IN	Pass
J301-21	P511-23	CH 13 - IN	Pass
J301-22	P511-25	CH 14 - IN	Pass
J301-25	P511-1	CH 15 - IN	Pass
J301-3	P511-5	CH 4 - IN	Pass
J301-4	P511-7	CH 5 - IN	Pass
J301-60	E1	CHASSIS GND	Pass
J301-7	P511-9	CH 6 - IN	Pass
J301-9	P511-11	CH 7 - IN	Pass
J301-90	E2	CHASSIS GND	Pass
J304-43	P512-5	+15V(2)	Pass
J304-45	P512-24	+15V(2)	Pass
J304-46	P512-9	15VRTN(2/3)	Pass
J304-48	P512-29	15VRTN(2/3)	Pass
J304-49	P512-14	-15V(3)	Pass
J304-51	P512-15	-15V(3)	Pass
J305-68	P512-12	PRT35_HI (PRE AMP)	Pass
J305-72	P512-11	PRT35_LO (PRE AMP)	Pass
J326-76	E3	CHASSIS GND	Pass

Assembly No. 1331670-2

Shop Order No. 292504

Serial No. F01

Pass ☒ Fail ☐

Test Engineer [Signature] 3/4/98  
(Signature) (Date)

Quality Control [Signature] 3-5-98  
(Signature) (Date)

Customer Representative (Flight hardware only) [Signature] 3-31-98  
(Signature) (Date)



**TEST DATA SHEET 2**  
A1 Power Distribution (Paragraphs 4.2.2 & 4.2.3)

Power Supply Voltages:

+5.7 ± 0.1V: +5.70V  
-15.7 ± 0.1V: -15.72V

+15.7 ± 0.1V: +15.75V  
+28.7 ± 0.1V: +28.70V

Test Set-up Verified: YES ☒ NO ☐

Para. 4.2.3 Step No.	Connector No.	+5 ±0.5 V	P/F	+15 ±0.3V	P/F	-15 ±0.3V	P/F	+28 ±0.56V	P/F	+9 ±1V *	P/F
7 <del>18</del>	J301									+8.69	P
21	J303			+15.05	P	-15.03	P				
21	J304			+15.05	P	-15.03	P				
43	J305			+15.05	P	-15.03	P				
54	J306			+15.05	P	-15.03	P				
85	J307	+4.96	P	+15.05	P	-15.03	P				
85	J308			+15.05	P	-15.03	P				
85	J309			+15.05	P	-15.03	P				
85	J310			+15.05	P	-15.03	P				
85	J311			+15.05	P	-15.03	P				
85	J312	+4.96	P							+8.68	P
85	J313	+4.97	P							+8.68	P
85	J314	+4.96	P								
85	J315	+4.96	P								
85	J316	+4.96	P								
85	J317	+4.96	P								
85	J318	+4.96	P								
85	J319	+4.96	P	+15.05	P	-15.03	P	+27.97	P		
85	J320	+4.97	P	+15.05	P	-15.03	P				
85	J321	+4.97	P								
85	J322	+4.97	P	+15.05	P	-15.03	P				
85	J323	+4.97	P	+15.05	P	-15.03	P				
85	J324	+4.97	P								
85	J325	+4.97	P	+15.05	P	-15.03	P				
76	J327	+4.98	P	+15.05	P	-15.03	P	+27.96	P		

\* Measured at Paragraph 4.2.5.2 Test  
Assembly No. 1331670-2

Shop Order No. 292504

Serial No. F01

Pass ☒ Fail ☐

Test Engineer D. Lund 3/4/98  
(Signature) (Date)

Quality Control [Signature] 3-8-98  
(Signature) (Date)

Customer Representative (Flight hardware only) R. Brown 3-31-98  
(Signature) (Date)

TEST DATA SHEET 3 (Sheet 1 of 2)  
A1 Digital Processor (Paragraph 4.2.4 )

CPU CCA Serial No. (J316) F08  
Scan Control Interface CCA Serial No. (J318) F23  
Timing and Control CCA Serial No. (J315) F09

4.2.4.1 Memory tests:

4.2.4.1/10 Circle Pass or Fail to indicate the result of the tests :

Pass Fail

If "Fail", record the error code and error description.

Error Code: None

Error Description: None

4.2.4.2 CPU tests:

4.2.4.2/10

	<u>Measurements</u>	<u>Limits</u>	<u>Pass/Fail</u>
Vp-p	<u>4.00V</u>	3.30 - 4.94 V	<u>Pass</u>
T	<u>801 nS</u>	761 - 841 ns	<u>Pass</u>

4.2.4.2/19 Circle Pass or Fail to indicate the result of the CPU tests  
(with 8 Sec Sync Pulse coming from the J314 - pin 49).

Pass Fail

~~If "Fail", record the error code and error description.~~

~~Error Code: \_\_\_\_\_~~

~~Error Description: \_\_\_\_\_~~

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4.2.4.3 Scan Control Interface Tests:

4.2.4.3/16 The input ports 0 and 1 tests

Pass Fail

4.2.4.3/23 Inhibit input port 0 and 1 tests

Pass Fail

4.2.4.3/35 The input ports 2 and 3 tests

Pass Fail

4.2.4.3/43 Inhibit input port 2 and 3 tests

Pass Fail

4.2.4.3/55 The output ports 0 and 1 tests

Pass Fail



TEST DATA SHEET 4  
A1 Relay Driver Tests (Paragraph 4.2.5.2)

Spacecraft Interface #2 CCA (J312) Ser. No. F22  
Spacecraft Interface #1 CCA (J313) Ser. No. F14  
Parallel to Serial Converter CCA (J314) Ser. No. F24  
Relay Driver And Current Monitor CCA (J319) Ser. No. F03

Test Set-up Verified:

Yes ☒ No ☐

STE Self Test: Pass ☒

Fail ☐

Step No.	Test Description	Pass/Fail
23	Module power connects	Pass
26	Survival heater power turns on	Pass
27	Survival heater power turns off	Pass
28	Module power disconnects	Pass
30	Scanner 1 power turns on	Pass
31	Scanner 2 power turns on	Pass
32	Scanner 1 power turns off	Pass
32	Scanner 2 power turns off	Pass
34	PLLO toggle	Pass
35	Module power disconnect	Pass

Assembly No. 1331670-2

Shop Order No. 292504

Serial No. F01

Pass ☒ Fail ☐

Test Engineer [Signature] 3/4/98  
(Signature) (Date)

Quality Control [Signature] 3-5-98  
(Signature) (Date)

Customer Representative (Flight hardware only) [Signature] 3-31-98  
(Signature) (Date)

**TEST DATA SHEET 5**  
A1 Independence Of Measurements (Paragraph 4.2.6.1)

Analog Mux and A/D Converter CCA Serial No. F03

Test Set-up verified: YES ☒ NO ☐

Supply	Measured Value (V)	Limits (V)
+5	<u>+4.80</u>	+5 ± 0.25
+15	<u>+15.88</u>	+15 ± 1.0
-15	<u>-15.44</u>	-15 ± 1.0

Integrate and Dump/Filter CCA Serial No.	Channel No.	Average for SIGNAL switch in HI position	Average for SIGNAL switch in LO position	Measurement Dependence ≤0.01%	Pass/Fail
F29	0	14100.6	14099.2	0.0021%	Pass
	1	14102.2	14100.5	0.0026%	Pass
	2	14103	14101.2	0.0028%	Pass
	3	14105.3	14103.4	0.0029%	Pass
F30	0	14033	14030.8	0.0034%	Pass
	1	14052.4	14049.9	0.0038%	Pass
	2	14042.8	14040.7	0.0032%	Pass
	3	14048.5	14046.1	0.0037%	Pass
F32	0	14047.9	14046	0.0029%	Pass
	1	14030.7	14029	0.0026%	Pass
	2	14050.8	14048.7	0.0032%	Pass
	3	14050.5	14048.3	0.0034%	Pass
F33	0	14040.5	14038.5	0.0031%	Pass
	1	14048	14045.8	0.0034%	Pass
	2	14034.1	14031.9	0.0034%	Pass
	3	14040.9	14038.8	0.0032%	Pass

Assembly No. 1331670-2

Shop Order No. 292504

Serial No. F01

Pass ☒ Fail ☐

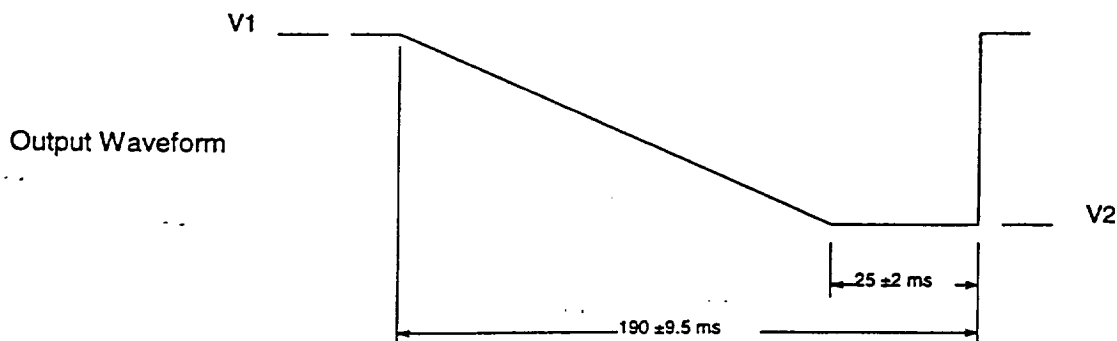
Test Engineer D. Lund 3/4/98  
(Signature) (Date)

Quality Control [Signature] 3-3-98  
(Signature) (Date)

Customer Representative (Flight hardware only) R. Proulx 3-3-98  
(Signature) (Date)

TEST DATA SHEET 6 (Sheet 1 Of 2)  
A1 Integrator Signal Multiplexing, And Digitization (Paragraph 4.2.6.2)

Analog Mux and A/D Converter CCA: Ser. No. F03  
Integrate and Dump/Filter CCA:  
Rack Slot J308: Ser. No. F29  
Rack Slot J309: Ser. No. F30  
Rack Slot J310: Ser. No. F31  
Rack Slot J311: Ser. No. F33



Channel	Data	Data Limits	Data Pass/Fail	Integrator Waveform Pass/Fail
3	29143	27282 to 31076	Pass	Pass
4	29022	27282 to 31076	Pass	Pass
5	28890	27282 to 31076	Pass	Pass
6	28972	27282 to 31076	Pass	Pass
7	29136	27282 to 31076	Pass	Pass
8	29056	27282 to 31076	Pass	Pass
9	29061	27282 to 31076	Pass	Pass
10	29043	27282 to 31076	Pass	Pass
11	29130	27282 to 31076	Pass	Pass
12	28972	27282 to 31076	Pass	Pass
13	29039	27282 to 31076	Pass	Pass
14	29018	27282 to 31076	Pass	Pass
15	29048	27282 to 31076	Pass	Pass

**TEST DATA SHEET 6 (Sheet 2 Of 2)**  
A1 Integrator Signal Multiplexing, And Digitization (Paragraph 4.2.6.2)

Signal Name	Output	Output Return	Signal Levels	Pass/Fail
I/H	J301-42	J301-41	Pulses (TTL)	<i>Pass</i>
Dump	J301-45	J301-41	Pulses (TTL)	<i>Pass</i>
+5 Vdc GSE Interlock A	J301-61	J301-70	+5 V	<i>Pass</i>
+5 Vdc GSE Interlock B	J301-62	J301-70	+5 V	<i>Pass</i>

Assembly No. 1331670-2

Shop Order No. 292504

Serial No. F01

Pass ☒ Fail ☐

Test Engineer *[Signature]* 3/4/98  
(Signature) (Date)

Quality Control *[Signature]* 3/4/98  
(Signature) (Date)

Customer Representative (Flight hardware only) *[Signature]* 3.31.98  
(Signature) (Date)

TEST DATA SHEET 7 (Sheet 1 of 2)  
A1 Temperature Monitoring Circuits (Paragraph 4.2.6.3)

Temperature Sensor A CCA (J303) Serial No. F08  
Temperature Sensor B CCA (J304) Serial No. F25  
Temperature Sensor B CCA (J305) Serial No. F26  
Temperature Sensor Analog Mux CCA (J306) Serial No. F15

Dig. A Temp No.	Description	Data	Data Limits	Pass/Fail
1	Scan Motor A1-1	30893	28259 to 32513	Pass
2	Scan Motor A1-2	31232	28259 to 32513	Pass
3	Feedhorn A1-1	31065	28259 to 32513	Pass
4	Feedhorn A1-2	31437	28259 to 32513	Pass
5	RF MUX A1-1	30904	28259 to 32513	Pass
6	RF MUX A1-2	30752	28259 to 32513	Pass
7	LO CH 3	30764	28259 to 32513	Pass
8	LO CH 4	30832	28259 to 32513	Pass
9	LO CH 5	31199	28259 to 32513	Pass
10	LO CH 6	30894	28259 to 32513	Pass
11	LO CH 7	31031	28259 to 32513	Pass
12	LO CH 8	30562	28259 to 32513	Pass
13	LO CH 15	30731	28259 to 32513	Pass
14	PLO #2	30830	28259 to 32513	Pass
15	PLO #1	30899	28259 to 32513	Pass
16	N/A	N/A	<del>28259 to 32513</del> N/A	N/A
17	Mixer IF CH 3	30944	28259 to 32513	Pass
18	Mixer IF CH 4	30924	28259 to 32513	Pass
19	Mixer IF CH 5	30815	28259 to 32513	Pass
20	Mixer IF CH 6	31050	28259 to 32513	Pass
21	Mixer IF CH 7	30743	28259 to 32513	Pass
22	Mixer IF CH 8	30630	28259 to 32513	Pass
23	Mixer IF CH 9/14	30833	28259 to 32513	Pass
24	Mixer IF CH 15	30854	28259 to 32513	Pass
25	IF Amp CH 11/14	30807	28259 to 32513	Pass
26	IF Amp CH 9	31039	28259 to 32513	Pass
27	IF Amp CH 10	30881	28259 to 32513	Pass
28	IF Amp CH 11	30936	28259 to 32513	Pass
29	DC/DC Conv	30815	28259 to 32513	Pass
30	IF Amp CH 13	30944	28259 to 32513	Pass
31	IF Amp CH 14	30720	28259 to 32513	Pass
32	IF Amp CH 12	30653	28259 to 32513	Pass
33	RF Shelf A1-1	31071	28259 to 32513	Pass
34	RF Shelf A1-2	30672	28259 to 32513	Pass
35	Detector/Preamp	31084	28259 to 32513	Pass

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TEST DATA SHEET 7 (Sheet 2 of 2)  
A1 Temperature Monitoring Circuits (Paragraph 4.2.6.3)

Dig. A Temp No.	Description	Data	Data Limits	Pass/Fail
36	A1-1 Warm Load 1	22290	20339 to 23401	Pass
37	A1-1 Warm Load 2	22263	20339 to 23401	Pass
38	A1-1 Warm Load 3	22463	20339 to 23401	Pass
39	A1-1 Warm Load 4	22176	20339 to 23401	Pass
40	A1-1 Warm Load C	22316	20339 to 23401	Pass
41	A1-2 Warm Load 1	22594	20339 to 23401	Pass
42	A1-2 Warm Load 2	22283	20339 to 23401	Pass
43	A1-2 Warm Load 3	22381	20339 to 23401	Pass
44	A1-2 Warm Load 4	22303	20339 to 23401	Pass
45	A1-2 Warm Load C	22173	20339 to 23401	Pass
46	Thermal Reference	25007	23340 to 26320	Pass

Assembly No. 1331670-2

Shop Order No. 292504

Serial No. F01

Pass ☒ Fail ☐

Test Engineer D. Lind 3/4/98  
(Signature) (Date)

Quality Control [Signature] 3-5-98  
(Signature) (Date)

Customer Representative (Flight hardware only) R. D. [Signature] 3-3-98  
(Signature) (Date)

TEST DATA SHEET 8  
A1 Analog Telemetry (Paragraph 4.2.6.4)

ANALOG HSKP Switch Position	DVM Reading (V)	Limits (V)	Pass/Fail
1	3.01	2.85 to 3.15	Pass
2	3.47	3.30 to 3.66	Pass
3	3.00	2.87 to 3.17	Pass
4	3.03	2.85 to 3.15	Pass
5	3.47	3.30 to 3.66	Pass
6	3.02	2.87 to 3.17	Pass
7	3.47	3.30 to 3.66	Pass
8	3.01	2.87 to 3.17	Pass
9	3.00	2.85 to 3.15	Pass
10	3.59	3.42 to 3.78	Pass
11	3.28	3.13 to 3.45	Pass
12	2.98	2.84 to 3.14	Pass
13	2.97	2.84 to 3.14	Pass
14	2.98	2.84 to 3.14	Pass
15	2.98	2.84 to 3.14	Pass
16	2.99	2.84 to 3.14	Pass
17	2.98	2.84 to 3.14	Pass
18	3.47	3.30 to 3.66	Pass
19	4.47	4.30 to 4.66	Pass
19	0.46	0.4 to 0.48	Pass
20	4.47	4.30 to 4.66	Pass
20	0.46	0.4 to 0.48	Pass
21	+0.002	-0.05 to 0.05	Pass
21	2.97	2.8 to 3.4	Pass
22	+0.007	-0.05 to 0.05	Pass
22	2.95	2.8 to 3.4	Pass

Assembly No. 133/670-2

Shop Order No. 292504

Serial No. F01

Pass ☒ Fail ☐

Test Engineer D. L. L. 3/4/98  
(Signature) (Date)

Quality Control [Signature] 3/4/98  
(Signature) (Date)

Customer Representative (Flight hardware only) R. D. [Signature] 3-31-98  
(Signature) (Date)

# TEST DATA SHEET 9

A1 Scan Drive/ Signal Processor Tests (Paragraph 4.3.1 And 4.3.2)

## A1-1 Drive Subsystem CCAs:

Interface Converter CCA (J320) Ser. No. F28  
Resolver Data Isolator CCA (J321) Ser. No. F20  
R/D Converter/Oscillator CCA (J322) Ser. No. F18  
~~Motor Driver 3 Hall Sensor (J401) Ser. No.~~

Test Set-up Verified: Yes ☒ No ☐

Para/Step No.	Mode	Pass/Fail
4.3.1.2.1/12 H	Motor in warm cal position	Pass
4.3.1.2.2/3	Motor in nadir position	Pass
4.3.1.2.3/2	Motor in cold cal position 1	Pass
4.3.1.2.3/3	Motor in cold cal position 2	Pass
4.3.1.2.3/4	Motor in cold cal position 3	Pass
4.3.1.2.3/5	Motor in cold cal position 4	Pass
4.3.1.2.4/5	Motor in full scan mode	Pass
4.3.1.2.5/9	GSE mode 2	Pass
4.3.1.2.6/4	GSE mode 4	Pass
4.3.1.2.7/4	GSE mode 5	Pass
4.3.1.2.8/4	GSE mode 1	Pass
4.3.1.2.9/4	GSE mode 3	Pass
4.3.1.2.9/7	GSE mode 7	Pass
4.3.1.2.10/2	Scan power off	Pass

## A1-2 Drive Subsystem CCAs:

Interface Converter CCA (J323) Ser. No. F29  
Resolver Data Isolator CCA (J324) Ser. No. F36  
R/D Converter/Oscillator CCA (J325) Ser. No. F19  
~~Motor Driver 3 Hall Sensor (J404) Ser. No.~~

Test Set-up Verified: Yes ☒ No ☐

Para. No./Step No.

4.3.2.2 A1-2 scan drive operates in full scan mode. Pass ☒ Fail ☐

Assembly No. 1331670-2

Shop Order No. 292504

Serial No. F01

Pass ☒ Fail ☐

Test Engineer D. Lund 3/4/98  
(Signature) (Date)

Quality Control [Signature] 3/3/98  
(Signature) (Date)

Customer Representative (Flight hardware only) R. Druce 3-5-98  
(Signature) (Date)

**TEST DATA SHEET 10**  
**A1 Supply Currents (Paragraph 4.4)**

Voltages	Measured Current	Limits (in mA)	Pass/Fail
+28.7V	7.7	6 to 12	Pass
+5.7V	808	700 to 1642	Pass
+15.7V	195	152 to 364	Pass
-15.7V	190	162 to 381	Pass

Assembly No. 1331670-2

Shop Order No. 292504

Serial No. F01

Pass ☒ Fail ☐

Test Engineer [Signature] 3/4/98  
(Signature) (Date)

Quality Control [Signature] 3-5-98  
(Signature) (Date)

Customer Representative (Flight hardware only) [Signature] 3-31-98  
(Signature) (Date)

TAR NO. <u>003142</u> TEST ANOMALY RECORD	SYSTEM NO. _____	ASSY NAME <u>METSAT A1</u>
	DATE <u>12/8/97</u> Page 1 of 1	ASSY P/N <u>1331670-2</u> REV <u>1</u>
(REF. MPI 00-005)	SPEC (MPI, AE, ...) <u>26754</u> REV <u>~</u>	ASSY S/N <u>F01</u>
	CUMULATIVE TIME _____ hrs _____ min	S/O NO. <u>292504</u>
	ELAPSED TIME _____ hrs _____ min	TEST OPER NO. <u>8040</u> STEP <u>4</u>
		<u>AMEND. 1</u>

First time for failure at this point? YES ☒ NO ☐ Test Proc Para No. where failure occurred 4.2.4.2

Type of test (EXP: T/C 1 FFT HOT) TEST PROCEDURE PROOFING Para Step No. 10

DESCRIPTION OF ANOMALY (LIST EXPECTED AND RECORDED VALUES): NO CLOCK SIGNAL AT  
CLOCK jack on TRU. SHOULD BE 3.3 to 4.94 V. MEASURED ZERO.

TECH/TE NOTIFIED TEAM LEADER NAME <u>A. NIETO</u>	DEFECT CODE <u>MW</u>	TECH <u>[Signature]</u> DATE <u>12-8-97</u>
---	-----------------------	---

## INSTRUCTIONS:

OPER. STATION TEST  
3040 AMSU Test to notify inspection of failure/anomaly. (Except engineering, MPI or Pretest.)

3045 INSP Inspection to notify DCMC of failure / anomaly. (GFE)

PROD [Signature] INSP. [Signature]  
12/8/97 12/8/97  
TA  
867  
867

## TROUBLESHOOT/REWORK/RETEST ACTION PLAN:

TROUBLESHOOT TO DETERMINE CAUSE OF PROBLEM

NOTE: Remove pink copy here. Deliver to QA drop box.	TE <u>[Signature]</u> DATE <u>12/8/97</u>
	TEAM LEADER <u>[Signature]</u> DATE <u>12/8/97</u>

## TROUBLESHOOT/REWORK/RETEST/INSTRUCTIONS:

OPER.	STATION		PROD	INSP	RMKS
<u>8008</u>	<u>TEST</u>	<u>PERFORM CONTINUITY CHECK ON TRU AND</u>			
		<u>OUT TO DETERMINE POINT AT WHICH CLOCK</u>			
		<u>SIGNAL IS LOST AND REASON FOR LOSS.</u>			
		<u>CONTINUE TEST PER AE-26754, CORRECTIVE</u>			
		<u>ACTION TO BE DONE AFTER TEST COMPLETION.</u>			

NOTE: For parts replacement continuation page is MANDATORY

PASSED Retest/Start TECH DATE	FAILED Retest/Start TECH DATE	GO TO S/O CONT., OR OPERATION <u>8040</u> PAGE <u>2</u> <u>AMEND. 1</u>	TECH <u>[Signature]</u> DATE <u>12/8/97</u> QA <u>[Signature]</u>
-------------------------------------	-------------------------------------	---	--

WHAT WAS THE CAUSE OF THE ANOMALY?	CORRECTIVE ACTION:
<u>WISTED PAIR CLOCK LINES</u>	<u>SEND BACKPLANE TO WIREWRAP</u>
<u>MISSING FROM BACKPLANE</u>	<u>SUPPLIER FOR INSTALLATION OF WIRES</u>
	<u>(SHIPPER 9641)</u>
	DATE <u>12/8/97</u> TEAM LEADER <u>[Signature]</u>

Deliver completed yellow copy to QA drop box; Completed original to parent S/O

TAR NO. 002330

SYSTEM NO. \_\_\_\_\_

TEST ANOMALY RECORD

DATE 2/3/98 Page 1 of 1

SPEC (MPI, AE, ...) AE-26754 REV -

CUMULATIVE TIME - hrs - min

ELAPSED TIME - hrs - min

ASSY NAME METSAT A1 SIGNAL PROCESS ASSY.

ASSY P/N 1331670-2 REV F

ASSY S/N F61

S/O NO. 292504

TEST OPER NO. 120 STEP A

REF. MPI 00-005)

First time for failure at this point? YES ☒ NO ☐ Test Proc Para No. where failure occurred 4.2.3

Type of test (EXP: T/C 1 FFT HOT) Functional test Para Step No. 5

DESCRIPTION OF ANOMALY (LIST EXPECTED AND RECORDED VALUES):

Found a short between -15V and +10V power supplies lines

TECH/TE NOTIFIED TEAM LEADER NAME NIECO, AL

DEFECT CODE SE 3-4

TECH DATE 2/3/98

INSTRUCTIONS:

OPER. STATION

3000 TEST Test to notify inspection of failure/anomaly. (Except engineering, MPI or Pretest.)

3001 INSP Inspection to notify DCMC of failure / anomaly. (GFE)

PROD.

INSP.

TROUBLESHOOT/REWORK/RETEST ACTION PLAN:

Troubleshoot to determine cause of problem.

NOTE: Remove pink copy here. Deliver to QA drop box.

TE DATE 2/3/98 QEV 200302 RE DATE 2/3/98  
TEAM LEADER

TROUBLESHOOT/REWORK/RETEST/INSTRUCTIONS:

OPER. STATION

PROD

INSP

RMKS

2010	TEST	Troubleshoot backplane to determine cause of problem	2/3/98	
1		Examine Backplane Assy under magnification for obvious damage	2/3/98	

3020 MFG Remove bare wire debris

3030 Test Repetition Power distribution test

3040 Ret Notify Inspection to notify DCMC reinspection of test.

NOTE: For parts replacement continuation page is MANDATORY

PASSED  
Retest/Start  
TECH DATEFAILED  
Retest/Start  
TECH DATEGO TO S/O CONT., OR  
OPERATION 120 PAGE 10

TECH DATE 2/3/98 QEV 200302

WHAT WAS THE CAUSE OF THE ANOMALY?

a piece of bare wire was found  
cross two socket pins on the  
plugging side of the J326 connector

CORRECTIVE ACTION:

NONE REQUIRED

TECH DATE 3/2/98 QEV 200303  
TEAM LEADER

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QEN NO.	GU-TEST	DATE	11/25/
REVISION:	F	DATE	09/19/
PAGE	1 OF 3		

S/O NO.	OPERATION NO.	PART NO.	CEG. LTR.
PROJECT NAME	PART NAME	LOT OR SERIAL NO.	CEG. LTR.
PREPARED:	LOT SIZE	NEXT ASSEMBLY	
V.E. FELIX			

CHAR. NO.	CHARACTERISTIC	INS. STA.
	<p><u>GENERAL</u></p> <p>A. THIS GU-TEST SHALL BE USED AS A CHECKLIST WHEN PERFORMING TEST SET-UP, TEST MONITOR/WITNESS, AND TEST DATA REVIEW AND ACCEPTANCE.</p> <p>B. INSPECTION TIME SHALL BE CHARGED TO THE APPROPRIATE SHOP ORDER OPERATION FOR THE WORK PERFORMED PER APPLICABLE COMMAND MEDIA/PROGRAM DIRECTIVE.</p> <p>C. FOR THOSE TESTS WHERE THE AE-SPEC BECOMES A PART OF THE PLANNING PACKAGE, THE REQUIREMENTS OF CHARACTERISTIC 3, SECTION 1 SHALL APPLY.</p> <p>D. THIS GU-TEST IS DIVIDED INTO THREE SECTIONS: NOTIFICATION OF TEST, TEST MONITOR/WITNESS, AND DATA REVIEW. EACH SECTION SHALL BE PERFORMED FOR EACH TEST/RETEST AS REQUIRED BY THE SHOP ORDER.</p> <p>E. A SEPARATE GU-TEST SHALL BE STAMPED AND DATED BY THE INSPECTOR AS PERFORMED AND COMPLETED.</p> <p>F. DISCREPANCIES OR REQUIRED ACTIONS SHALL BE DOCUMENTED ON AN EQCR OR TEST REPORT (TAR or TRR) AS APPLICABLE.</p> <p>G. EACH STEP SHALL BE STAMPED AND DATED BY THE INSPECTOR AS PERFORMED AND COMPLETED. NOTE: STEPS WHICH ARE NOT APPLICABLE SHALL BE ANNOTATED WITH AN "N/A" IN THE RESPECTIVE BUBBLE BY THE INSPECTOR.</p> <p>H. THE COMPLETED GU-TEST SHALL BE FILED WITH THE SHOP ORDER PACKAGE.</p>	
	<p><u>SECTION 1: NOTIFICATION OF TEST</u></p> <p>1. COMPLETE HEADING OF THIS GU-TEST WITH THE APPLICABLE SHOP ORDER INFORMATION INCLUDING THE APPLICABLE TEST OPERATION(S).</p> <p>2. VERIFY THAT THE REQUIRED AE-SPEC IS AT THE TEST STATION AND IS THE CORRECT REVISION AND ENTERED ON THE DCS. CALL EXT. 2231 FOR THE LATEST REVISION.</p> <p>3. ENTER THE SHOP ORDER NUMBER, PART NUMBER, SERIAL NUMBER, AND TEST OPERATION ONTO THE COVER PAGE OF THE AE-SPEC, AS APPLICABLE.</p> <p>4. REVIEW THE AE-SPEC AND READ AND UNDERSTAND THE <u>QUALITY ASSURANCE PROVISIONS</u> PAGE(S).</p> <p>5. RECORD SOFTWARE REV. <u>2231</u>. VERIFY WITH DOC CENTER AT X2377 OR COGNIZANT QE THAT THIS IS THE CURRENT REV. (IF APPLICABLE)</p>	

Q&NO.	GU-TEST	DATE	11/25/9.
REVISION:	F	DATE	09/19/9:
PAGE	2	OF	3

S/O NO.	OPERATION NO.
492504	2140

CHAR. NO.	CHARACTERISTIC	INSP. STAMP
	<u>SECTION I: CONTINUED</u>	
6.	IF ESD CERTIFICATION IS SPECIFIED IN THE AE-SPEC, VERIFY THAT THE TEST CONDUCTOR POSSESSES THE REQUIRED CERTIFICATION.	268
7.	VERIFY THAT ALL TEST EQUIPMENT IS IN CURRENT CALIBRATION AND THAT NO SEALS ARE BROKEN. COMPLETE THE TEST EQUIPMENT LIST (ATTACHED). FOR S/O'S WITH MULTIPLE TESTS USING THE SAME SPEC, LIST ALL EQUIPMENT ON ONE FORM. IF NECESSARY, REFERENCE THE COMPLETED FORM. NOTE: TEST EQUIPMENT WHICH BEARS A "LIMITED CALIBRATION" STATUS SHALL BE DOCUMENTED ON AN EQCR. TEST ACCEPTANCE SHALL BE WITHHELD UNTIL DISPOSITIONED.	268
8.	MONITOR OR VERIFY THE TEST SET-UP IN ACCORDANCE WITH THE AE-SPEC AND SHOP ORDER PLANNING.	268
9.	UPON COMPLETION OF STEPS 1-8, NOTIFY THE CUSTOMER OF TEST START PER SHOP ORDER PLANNING REQUIREMENTS.	268
	<u>SECTION II: TEST MONITOR/WITNESS</u>	
10.	MONITOR/WITNESS TESTING IN ACCORDANCE WITH THE SHOP ORDER PLANNING. REVIEW DATA PRINTOUTS AND/OR DATA SHEETS TO VERIFY DATA IS WITHIN THE AE-SPEC.	268
11.	VERIFY THAT THE AE-SPEC IS NOT REDLINED. REDLINES SHALL BE DOCUMENTED ON AN EQCR.	268
	<u>SECTION III: DATA REVIEW AND ACCEPTANCE</u>	
12.	VERIFY THAT ALL TAR'S OR TRR'S HAVE BEEN CLOSED.	268
13.	REVIEW ALL DATA SHEETS AND VERIFY THAT DATA MEETS THE AE-SPEC REQUIREMENTS.	268
14.	VERIFY THAT ALL DATA SHEETS ARE STAMPED AND DATED BY TEST, INSPECTION AND THE CUSTOMER/GOVERNMENT AS REQUIRED.	268
15.	VERIFY THAT ACCEPTANCE TEST REPORTS ARE PRESENT AND SIGNED-OFF AND DATED.	268
16.	VERIFY THAT ALL EQCR ITEMS HAVE BEEN DISPOSITIONED AND BOUGHT OFF BY INSPECTION.	268
17.	VERIFY THAT ALL SHOP ORDER AND II OPERATIONS HAVE BEEN STAMPED AND DATED.	268
3.	STAMP AND DATE THE APPLICABLE TEST OPERATION(S) ON THE SHOP ORDER.	268




S/O NO. 299,581-1	OPERATION NO. 2140
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### GU-TEST (ATTACHMENT 1) TEST EQUIPMENT LIST

<u>EQUIPMENT NAME</u>	<u>MODEL NUMBER</u>	<u>CAL DUE DATE</u>	<u>PROPERTY NUMBER or SERIAL NUMBER</u>
AASPTF	SK 1351293	CNR	743-5573
O' SCOPE	TEK TDS 380	2-13-99	2 00080
METSAT TRU	SK 1357273-001	CNR	743-5719
AMSW-A STE	N/A	NDG	743-5581
MOTOR DRIVER TEST FIX.	SK 1293735	CNR	743-5016
CPL AUXILIARY TEST CCA	SK 1357408	N/A	743-5573
I/O EXTENDER CARDS	SK 1357847	N/A	N/A
I/O EXTENDER (S) CABLE	SK 1357943	N/A	N/A
I/O EXT./ISS3 INTF. CABLE	SK 1357944	N/A	N/A
PERSONALITY MODULE FOR MEMORY	SK 1357947/1331126	N/A	N/A
PERSONALITY MODULE FOR SCAN CONTROL TEST	SK 1357947/1331124 (-1 thru -2)	N/A	N/A
PERSONALITY MODULE FOR TIMING AND CONTROL	SK 1357947/1331135 (-1 thru -4)	N/A	N/A
ADAPTOR BOX, 4-3 mV sensor	SK 1358259	CNR	743-5759
1K OHM ISOLATED CLIP LEAD	SK 1358335	N/A	N/A
SCAN DRIVE INTF. CABLE	SK 1358395	N/A	N/A
MOTOR DRIVER ADAPTOR INTF. CABLE	SK 1358701-1	N/A	N/A
UPPER CARD cage FIX.	SK 1359646	N/A	N/A
MEMORY CCA	1331126/ENG/60LD	N/A	N/A
MOTOR/RESOLVER ASSY.	SK 1358657	CNR	743-5683
ANALOG. CCA TSI FIX	SK 1357280	19 DEC 98	743-5006
DVM	HP 3456A	24 JUL 98	48007
Precision DC Source	Power Designs 2010	7 Feb 99	743-3655
Triple output P.S.	HP-6237B	17 OCT. 99	L-509223
P.S.	5015T	29 Aug. 99	L-509131

[illegible]

 <b>NASA</b> National Aeronautics and Space Administration				Report Documentation Page			
1. Report No. ---		2. Government Accession No. ---		3. Recipient's Catalog No. ---			
4. Title and Subtitle  Integrated Advanced Microwave Sounding Unit-A (AMSU-A), METSAT A1 Sig Processor, S/N F01				5. Report Date 4 May 1998			
				6. Performing Organization Code ---			
7. Author(s)  A. Nieto				8. Performing Organization Report No. 11137			
				10. Work Unit No. ---			
9. Performing Organization Name and Address Aerojet 1100 W. Hollyvale Azusa, CA 91702				11. Contract or Grant No. NAS 5-32314			
				13. Type of Report and Period Covered Final			
12. Sponsoring Agency Name and Address NASA Goddard Space Flight Center Greenbelt, Maryland 20771				14. Sponsoring Agency Code ---			
15. Supplementary Notes  ---							
16. ABSTRACT (Maximum 200 words )  This is the METSAT A1 Signal Processor Engineering Test Report, P/N 1331670-2, S/N F01 for the Integrated Advanced Microwave Sounding Unit-A (AMSU-A).							
17. Key Words (Suggested by Author(s))  Microwave System			18. Distribution Statement  Unclassified --- Unlimited				
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		21. No. of pages					

NASA FORM 1626 OCT 86

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6. AUTHOR(S) A. Nieto				
7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES) Aerojet 1100 W. Hollyvale Azusa, CA 91702			8. PERFORMING ORGANIZATION REPORT NUMBER  11137 4 May 1998	
9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES) NASA Goddard Space Flight Center Greenbelt, Maryland 20771			10. SPONSORING/MONITORING AGENCY REPORT NUMBER  ---	
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14. SUBJECT TERMS  Microwave System			15. NUMBER OF PAGES   16. PRICE CODE  ---	
17. SECURITY CLASSIFICATION OF REPORT Unclassified	18. SECURITY CLASSIFICATION OF THIS PAGE Unclassified	19. SECURITY CLASSIFICATION OF ABSTRACT Unclassified	20. LIMITATION OF ABSTRACT SAR	

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